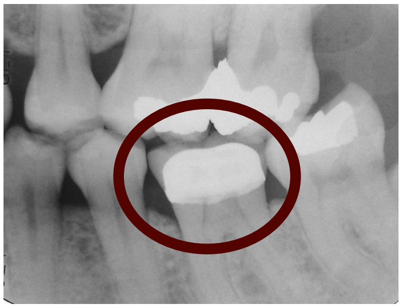
The Laminar Impression — Taking a Great Technique to an Even Higher Level.

If you make adjustments on more than 3% of your castings, read this ...

By Rodger Kurthy, D.M.D. – Mission Viejo, CA



(Fig. 1) If you're not getting margins like these routinely *(and without adjustments), here's a simple trick that belongs in your armamentarium.*

By making a slight modification to this proven impression technique, this dentist is getting the best fitting crowns he's seen in 21 years at the chair. Time involved? Less than 1 1/2 minutes in the mouth.

I've always taken enormous pride in the way my crowns fit.

A well-fitting crown means better use of my chairtime (no grinding to get the crown to seat ... and no massive occlusal adjustments.) When a crown fits truly well there's no bulky plaque-grabbing margin, so the soft tissue responds better.

Truth be told, when I drag my explorer up the root of a just-cemented crown and can't feel the margin, I actually get a rush.

For most of my career I didn't have much use for disposable double-arch trays. The idea of taking both the working and counter impressions plus the occlusal registration at the same time was intriguing. However a flexible tray loaded with a flexible impression material seemed a formula for springback distortion. In my opinion, double-arch trays were intended for dentists more interested in saving time than in providing the best possible dentistry.

The laminar revelation

For years I'd read about the laminar impression, but it wasn't till several colleagues (folks I really respected) told me they use it regularly that I decided to suspend my doublearch prejudice and give it a shot. I was very skeptical.

For those of you who don't know of the laminar technique, Dr. Gary Schoenrock of Perrysburg, OH developed it.

In a nutshell:

1) He takes a pre-preparation impression using a plastic double-arch tray loaded with a hard-setting impression material (eg Blu-Mousse®). If you want, this impression can also be used as a mold for the temp.

2) Two holes are drilled through the buccal of the impression ... one at the mesial of the crown to be prepped and one at its distal.

3) The tooth is prepared.

4) The impression is reseated and a medium or light-body wash material is injected into one hole till it flows freely out the other.

After just a couple of cases I was hooked. **I loved the laminar technique.** It was simple.

Fast. And best of all, the heavy majority of my laminar crowns went from the model to the mouth with minimal adjustment – often no adjustment at all!

(It wasn't just propaganda. This technique was really, really good.)

Notice that I wrote the "The heavy majority" required no adjustment ... but not all. I still had occasional narrow castings. It didn't occur often. But when it did occur, the cases had several things in common. They were always a crown ... never a bridge. Furthermore, it seemed that the problem cases were ones with perfectly matched occlusion— where you could see right through the preliminary impression all along the occlusal surface area.

I began to suspect why this was happening.

ABOUT the AUTHOR:

Dr. Kurthy maintains a full-time practice in Mission Viejo, California. He graduated at the top of his class from Fairleigh Dickinson University, and completed a G.P. residency at Newark Beth Israel Medical Center in 1979. He is the recipient of numerous awards and honors. Extensively involved in clinical research and product evaluation, Dr. Kurthy is author of the book Your Family Guide to a Healthy Mouth, soon to be published on his new public educational web site, www.Americas-Dentist.com. He has written feature articles discussing dental health for consumer magazines and has been interviewed extensively by local and national media.

Fig. 2A

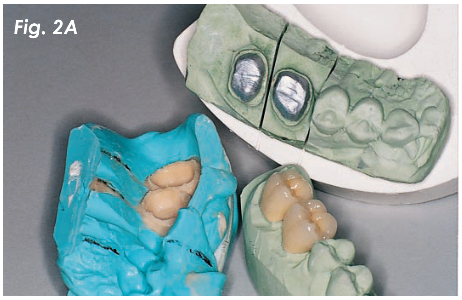
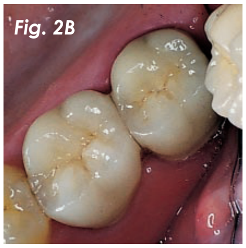


Fig. 2B



(Figs. 2A & 2B) *Because of its stiffness, Parkell cautions users not to expect more than one pour from a Blu-Mousse laminar impression. However, we've experienced no problems making multiple pours. These crowns fell home ... with no seating adjustments at all.*

Blu-Mousse is ideal for any Triple-Tray® technique (I like the version that sets in 30 seconds.) If you've ever tried it for bite registrations, you know how rigid it is. With its hardness of 85 durometer, the stuff sets like a rock. It's about 40% more rigid than conventional materials so it reinforces the flexible tray ... like an I-beam running from buccal to lingual.

Now think about it: When you impress a quadrant, particularly a quadrant with almost perfect intercuspation, there is virtually no Blu-Mousse in the center of the tray. As a result, after you've prepped the teeth and injected the wash, much of the overall buccolingual rigidity of the impression is determined not by the super-stiff Blu-Mousse but by the flexible wash. If the tray distorts during the wash step, this flexible material may not be able to resist springback when you remove the impression from the mouth.

And the result is a narrow casting.*

By making just one simple modification to Dr. Schoenrock's technique, I've eliminated this cause of distortion.

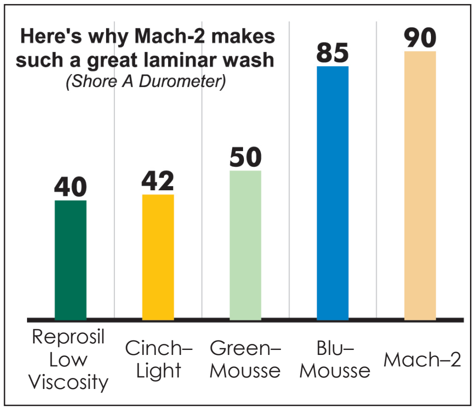
Enter Parkell's MACH-2® (die silicone?)

Instead of a conventional light body wash, I inject a flowable and very rigid-setting material.

With this modification, the laminar technique is now consistently giving me the greatest crown accuracy in my 21 years of practicing dentistry! In fact, as I write this, I'm running a string of more than 70 straight crowns with no seating adjustments. (None. **Zero!**)

Mach-2 is a very runny vinyl silicone. It was originally invented to replace stone for chairside models. Its runniness might be a problem in a conventional wash impression, but it's great for the laminar injection technique. (I'll show you why in a minute.) And it sets with a hardness rating of 92 Durometer! This material is VERY distortion resistant.

When you combine an outer framework of rigid Blu-Mousse, and the internal support of the Mach-2 wash (which is even *more* rigid that the Blu-Mousse), you get the fastest, easiest, most comfortable, and most fool-proof impression you can imagine. And you get unsurpassed accuracy to boot! And I can prove it! Just read on.



Many laminar officionados use Green-Mousse® as the wash because of its fast set and relative stiffness. But Mach-2 flows much better than Green-Mousse. And it sets both harder and faster than Green-Mousse (30 secs vs 2 mins). (Shore-A Durometer is a measurement of resistance to distortion under pressure.)

In the remainder of this article I'll show you how efficient, user-friendly, AND patient-friendly the technique is. I'll show you a few photos, but most important, I will show you a 'seat' radiograph of *each and every one* of my first 50 castings (including a couple of embarrassing cone cuts.)

The Preliminary Impression:

For anterior preparations, select a typical double-arch tray (any brand you feel comfortable with.) In the posterior, select a *sideless* double-bite impression tray (Fig. 3). The double-bite trays with sides are designed to hold conventional impression material, but very often the enlarged sides also cause distortion as the patient bites down (and they can cause gagging too). Parkell's Blu-Mousse impression material is so fluffy it does not need trays with sides anyway.

Use a very rigid vinyl polysiloxane material. As I already mentioned, I've found none that I like as much as Parkell's Blu-Mousse. Blu-Mousse is very fluffy. This means that the patients can't feel it when they bite down. (This also helps prevent gagging and doesn't cause the patient to bite out of centric occlusion).

Before you express the impression material, give the patients proper instructions regarding how to bite down. Have them practice a time or two. The patients must pretend there is nothing in their mouth and close with a *quick* motion. You'll find that a patient who closes slowly almost always does it incorrectly. When you bite quickly, the teeth just seem to naturally go to place.

Impression material is not cheap, so don't waste it. On both sides of the tray place only a medium layer of Blu-Mousse. Then add a little more onto the tray in the area(s) where teeth are to be prepared.

As the patient closes into centric occlusion, immediately check the opposite side to confirm the patient is fully in centric. If you do this immediately, there is still time to guide the patient into a proper bite if needed.

Time at least 30 seconds, and remove the preliminary impression. Be sure to point out to the patient how quick and easy the impression was and how there was no bad taste. The patients are going to LOVE this, particularly if they've ever had to endure a full-arch polyether impression!

Now check your impression to be certain you registered at least two millimeters of soft tissue around the teeth you will be preparing (Fig. 4). This 2mm collar is necessary to create a gasket effect around the preps. If there is a pull in the Blu-Mousse in this area (Fig. 5), when you later inject the wash instead of flowing around the prep, the wash could escape out the pulled area.

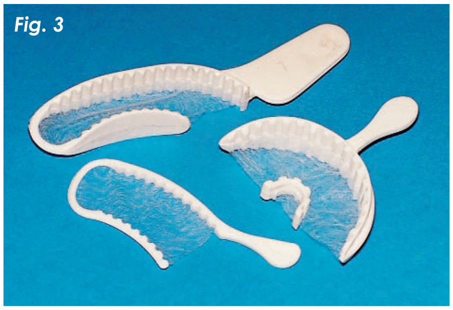


Fig. 3

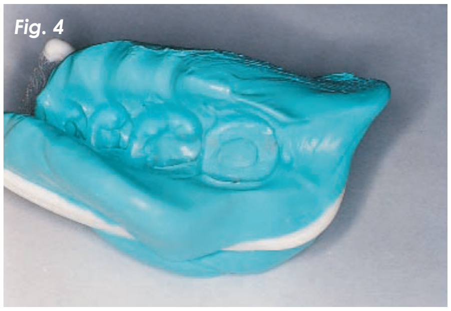


Fig. 4

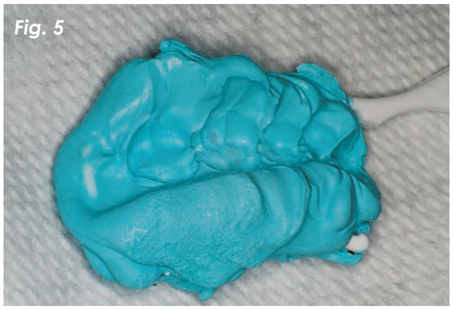


Fig. 5

(Fig. 3)** Use whatever brand double-arch tray you prefer, but in the posterior be sure to select a sideless tray (lower left).* ***(Fig. 4)** Before tooth preparation take a Blu-Mousse double-arch impression. The impression must capture at least 2mm of soft tissue around the teeth to be prepped. ***(Fig. 5)** Notice the pull by the first molar. When it's injected, the wash will flow out this defect.*

** If the patient has less-than-perfect occlusion or the impression includes a pontic area, the center of impression may include enough Blu-Mousse to prevent springback. ** The molar had been endodontically-treated through the old crown. You can see the worn filling on the occlusal.*

WAIT! If the impression has a pull, don't throw it away. All you have to do is add some Mach-2 to the defect, reinsert the impression, and have the patient bite again for 30 seconds. Most *wash* impression materials are viscous enough to go beyond the defect and create a thin lamination inside the impression. This will cause distortion. But Mach-2 is different. It's so runny, that when you add to the void area, any Mach-2 that goes inside other areas of the impression is just pushed back out again when the patient bites into the impression— no distortion at all! (Fig. 6) Mach-2 sets in the mouth in just 30 seconds so don't be a slow poke when you add the material.

If you do need to occasionally add a little Mach-2 to the preliminary impression, be sure to remove any obstacles that would interfere with reseating the impression (I'll discuss this later) and then clean the area to be added to with alcohol and water before you add Mach-2.

If your state laws permit it, your assistant can take the preliminary impression before you even enter the room.

Fabricating the Temporary Crown/Bridge:

After tooth preparation and tissue retraction, you can use the preliminary impression as a matrix to fabricate the provisional crown. Personally, I don't make my temps that way. My assistant fabricates the provisionals, and I don't like to wait while she uses the Blu-Mousse impression as a matrix. In an upcoming article, I will discuss an incredibly quick, easy (durable) technique for fabricating provisional crowns.

Preparation of the Preliminary Impression for the Final Wash:

If you practice in a state that allows your assistant to prepare the preliminary impression, have her do it — it's easy. Just look at both sides of the impression to find any areas that may prevent easy re-insertion onto the teeth. These would be any interproximal areas, undercuts, etc. Remove these obstacles with just about any bur. Be sure to perform this step before adding Mach-2 to a pulled area in the preliminary impression or before using the preliminary to fabricate the provisional crown.

Next, use a long, medium diameter diamond bur and drill two holes through the buccal of the preliminary impression into the proximals (one hole mesial and one hole distal) of the preparation site (Fig.7).

Now use a #8 round carbide bur and relieve the gingival margin area all around the prep (Fig. 8). This gives some thickness to the all-important finish line area of the final impression (Fig.9).

Clean the prep area of the impression with alcohol and water. Last, thoroughly dry the impression.

The Final Impression Wash

Use an automix cartridge of Mach-2 with a small intraoral tip on the end of the mixing tip (Fig. 10).

Depending on your retraction technique, remove any cord. If necessary, lightly dry the prep, reseat the impression and ask the patient to close firmly. Place the small cartridge tip into the distal hole and inject with moderate pressure. Allow a liberal amount of Mach-2 to exit through the other hole (Fig. 11) and remove the cartridge tip from the hole while still applying pressure. (Important: Do not release pressure before you remove the tip— you could cause some suck-back and create a void internally).

If you like, you can inject first into one hole as described above, and then quickly into the other hole also. Try it both ways and see which works best for you.

The Mach-2 is runny, but it will only exit on the buccal and will not run into the patient's mouth. After injecting, wait at least 35 seconds before removing the impression from the mouth.

When injecting, don't be afraid to apply moderate pressure on the automix cartridge gun. The Mach-2 is so thin that even if it is forced under unrelieved

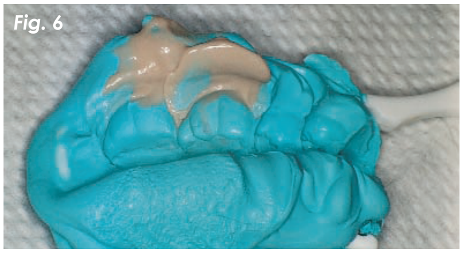


Fig. 6

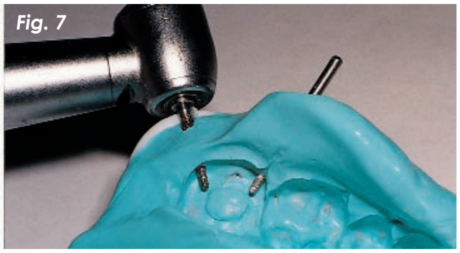


Fig. 7

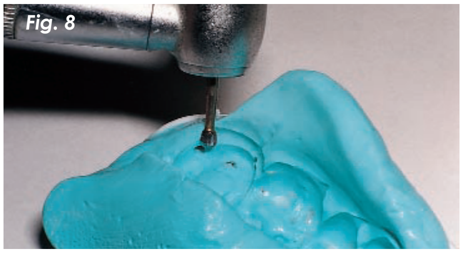


Fig. 8

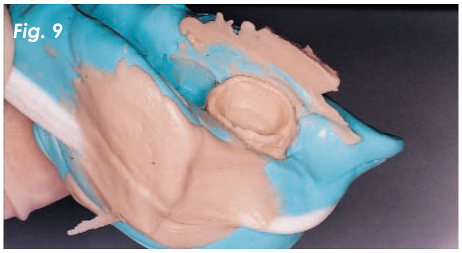


Fig. 9

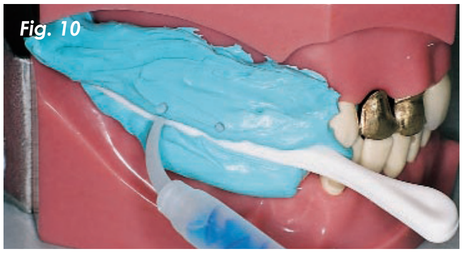


Fig. 10

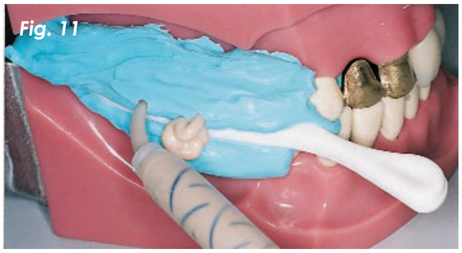


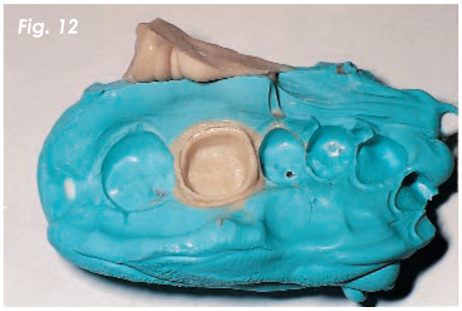
Fig. 11

(Fig. 6) *Relining with Mach-2 restores the seal. Because of its high flowability, the Mach-2 remained in the voids ... without laminating other areas of the impression.* ***(Fig. 7)*** *Drill two holes through the buccal into the proximals of the preparation site (one mesial, one distal.)* ***(Fig. 8)*** *Using a #8 round carbide bur, relieve the gingival margin area around each tooth that will be prepped. This relief assures there will be sufficient bulk of Mach-2 at the finish line (see next picture).* ***(Fig. 9)*** *Because of its low viscosity, when Mach-2 is later injected it will stay in the relieved area without causing unwanted lamination of the adjacent teeth.* ***(Fig. 10)*** *Inject the Mach-2 wash using a small intraoral tip on the end of the mixing tip.* ***(Fig. 11)*** *Inject into the distal hole using moderate pressure. Allow a liberal amount of Mach-2 to exit through the other hole. (After injecting the distal hole, the author likes to quickly inject into the mesial hole as well.)*

parts of the impression, the preliminary impression rebounds and forces all wash material out. You can see in the photo that the Mach-2 lamination layer does not create an additional thin layer inside the preliminary impression (Fig. 12) It only goes into the relieved portion and does not distort the impression.

The very hard Blu-Mousse preliminary impression gives significant strength, and the incredibly rigid Mach-2 gives internal support that defies distortion. The only thing that goes to the lab is the finished double-bite impression. There is no counter (opposing) impression to take (patients appreciate that too), no counter impression to pour, and no occlusal registration. You talk about easy and accurate!

Even if you do get some sulcular bleeding, the pressure of the wash material just pushes it out the exit hole — almost fool proof.



(Fig. 12) *Note again that the Mach-2 stays in the relieved area around the preparation. It does not create a thin layer inside the preliminary impression, which would cause distortion.*

If you have more than one prep adjacent to the other(s), just drill two holes — one in the distal-most proximal and one in the mesial-most proximal. This technique works for bridges and multiple upper and lower impressions also. If you were using a conventional wash material, the more preps in the impression, the weaker and more distortion-prone the impression would be. But with extra-hard Mach-2 as your wash, the impression actually becomes more rigid with multiple preps.

Due to the extreme rigidity of Mach-2, when developing this technique my only concern was the possible difficulty of removing the impression, especially in the presence of undercuts. After impressing many cases I can tell you that I have not had even one case where the impression was difficult to remove.

PROOF

Certain things just seem to make sense. Knowing the higher success rate of the Laminar Impression Technique, especially with exceptionally hard Blu-Mousse as the support material, it just made sense that Mach-2 (very low viscosity and a set hardness 7 durometer points harder than even Blu-Mousse) would be the missing link in achieving PERFECT and distortion-resistant impressions EVERY time.

Of course there are other techniques that give great casting fits, but none that combine perfect accuracy along with the speed, convenience, and extreme patient acceptability of this one.

At the time of writing of this article, I have inserted 73 units impressed with the Mach-2 Laminar Impression Technique. Twenty-three of those units were anterior jackets, which because of the absence of metal do not show clear marginal integrity on a 'seat' radiograph.

The other 50 were gold or porcelain/metal crowns and abutments. The real proof of impression accuracy is in the 'crown seat' radiographs of the first 50 units of posterior metal-based crowns. These include each and every one of the first 50—I did NOT just cull out the 'good' ones (see pages 6&7).

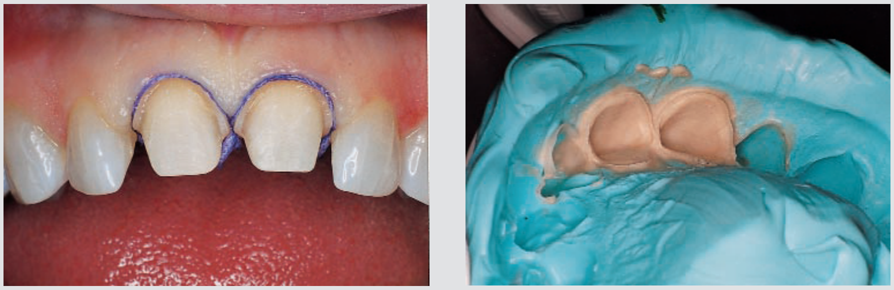
On these radiographs, you will see excellent margins and seating of every case. Now, that's proof of the great accuracy of the Mach-2 Laminar Impression Technique!

Note in the clinical photos of posterior cases (pages 1&5) that the Mach-2 Laminar Impressions withstand multiple model pours. You will see master models with removable dies, and solid models used for interproximal contact accuracy.

Of course, to achieve great results, you've also got to use a great lab. I'd like to thank Tommy Yamashita and his dental laboratory, DenTech International of Garden Grove, California for his superb work for the last twelve years.*

I have been practicing dentistry for almost 22 years, and I've always taken great pride in the fit of my castings. Several times I've had other dentists ask me how the heck I get my castings to fit so perfectly. But in all that time, I have NEVER used a technique that allowed such a perfect fit on the preps, interproximal contacts, and occlusion. I've never before experienced castings that seated to perfection so quickly in the mouth. I have cut the average time requirement for seating crowns to HALF!

Note: *Dr. Kurthy is not affiliated with any company mentioned in this article, and receives no compensation for mentioning products or services (In fact, he purchases them for his practice like any other dentist).*



Though some users of the laminar technique claim to skip retraction altogether, the author believes that the few minutes required to place cord are a small price to assure accurate margins. In this case, because of its superb flowability, the injected Mach-2 penetrated deep into the sulcus of the lateral. But compare the thin fin of material on the lateral with the robust margins on the centrals, where the tissue was retracted.

Notice that there is virtually no wash outside the preparation area. The 3 drops of Mach-2 at the vestibular boarder suggest that when it was injected a small amount of wash was forced under the Blu-Mousse impression ... but the pressure of the primary impression actually drove this flowable material out at the boarder.

** Tommy received undergrad and post-graduate degrees in dental technology and ceramics from a respected Japanese university. He has published numerous articles and is on the faculty of the UCLA graduate prosthodontics program and the prestigious USC Odontic Seminar. He worked with me closely developing this technique.*

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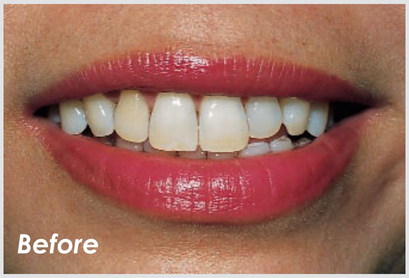
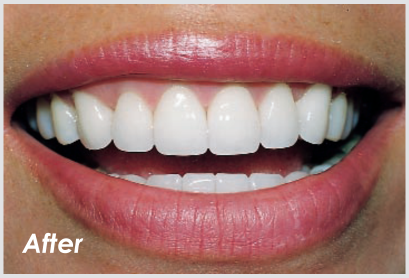
"I'm now using the Mach-2 Laminar Technique for all types of crowns and short bridges."





Porcelain jackets for cosmetic rehabilitation -
The patient was displeased with the color, the size, the shape, but mostly with the protrusion of her teeth. To reduce this protrusion, the teeth required significant facial reduction. That's why jackets were chosen instead of veneers.

The 6 maxillary anteriors were restored first (using a single Mach-2 laminar impression.) After they were cemented, the 6 lower anteriors were prepped using the uppers as a guide. The mandibular jackets were fabricated also using a single Mach-2 Laminar double-arch impression.

Maxillary pfm bicuspid crown
Both the master model and the working model were poured from a single Mach-2 Laminar Impression. Like all crowns we've made to date using the Mach-2 Laminar technique, this one required zero adjustment prior to cementation. (Incidentally, the radiograph showing marginal fit appears on page 6, Film #3)

Maxillary pfm molar crown
The radiograph of this crown appears on page 7, #29.

What if I DO miss an impression?

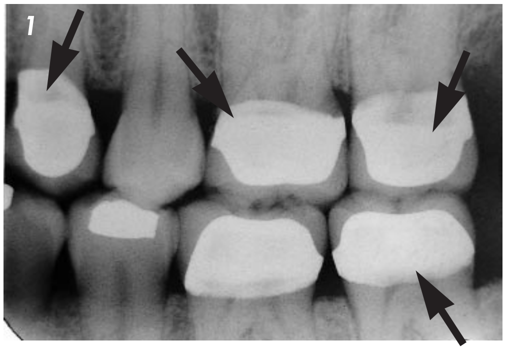
Using the Mach-2 Laminar Impression Technique, you may never miss an impression, but if you do, here's an easy way to take a perfect supplementary impression. By the way, this technique works well for any missed impression, regardless of the primary impression technique.

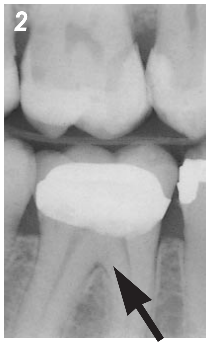
At worst, with the Mach-2 Laminar Impression Technique, if you ever miss the impression, you will need only a supplementary impression. The double bite laminar impression will still be your primary impression giving you a mounted articulation. If you work quickly, you will not even need to repack retraction cord (unless inadequate retraction was the problem in the first place).

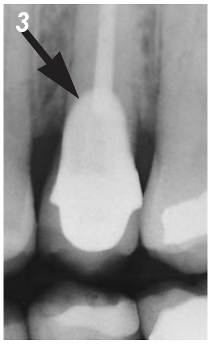
Using Super Fast Blu-Mousse and a large mixing tip, inject around the prepared tooth and one tooth mesial and distal to it. You do not need a tray. Make sure the thickness of Blu-Mousse over the prep is at least 5mm. After 30 seconds, you can remove the set Blu-Mousse. If the impression and margins are 'clean', you're done. If you have voids, remove any undercuts or floppy margin areas, and inject Mach-2 into the prep area inside the Blu-Mousse and reseat on the teeth with firm pressure. Maintain firm pressure for only two seconds, and then back off on the pressure and only passively hold the impression in place. Remove the supplementary impression after 35 seconds.

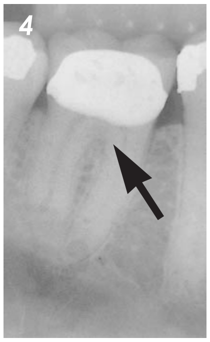
When first mixed, the Mach-2 is SO thin that the initial firm pressure forces it out of all areas other than the previous voids and any areas you relieved inside the Blu-Mousse Impression. After removal, you will find no internal evidence of Mach-2 other than in the previous voids and areas you may have relieved.

The best fits I've seen in 21 years at the chair . . . and to belabor the point, here are post-cementation films of my first 50 cast and pfm crowns.









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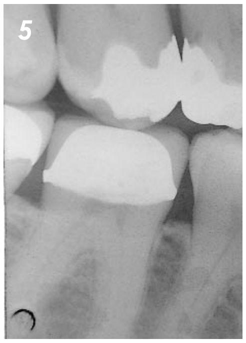
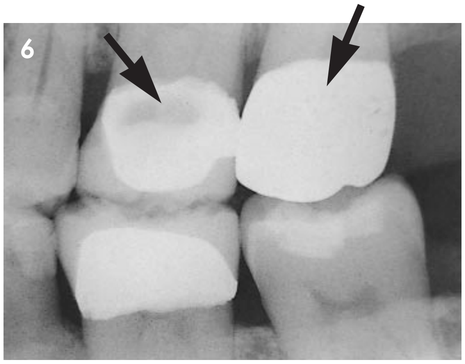
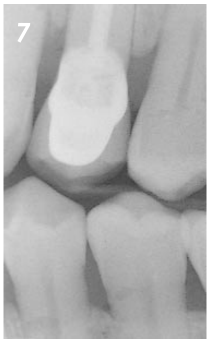
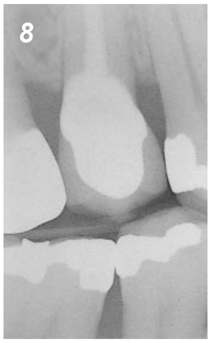
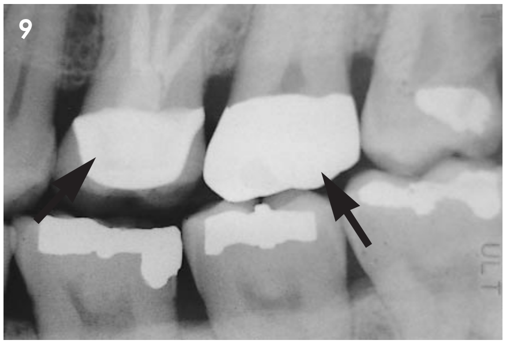


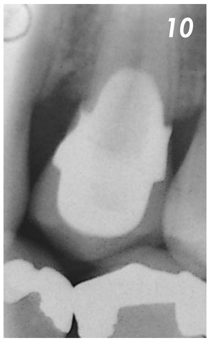


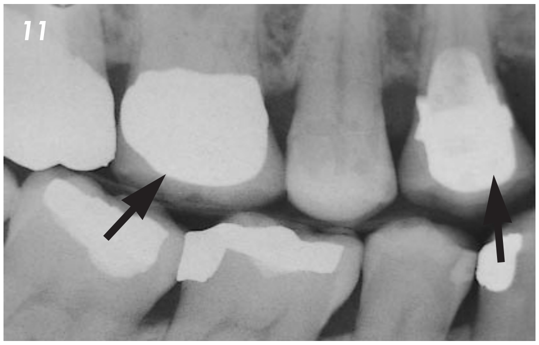




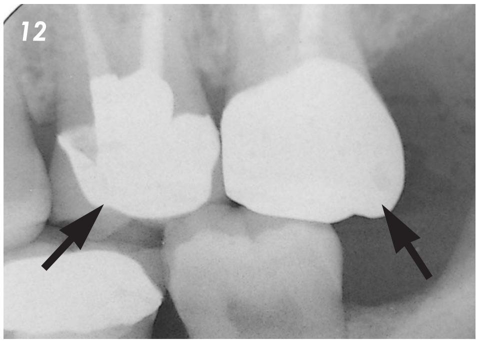
__(5)__ PATIENT: EJ, CROWN 31 __(6)__ PATIENT: EJ, CROWNS 14&15 __(7)__ PATIENT: PH, CROWN 12 __(8)__ PATIENT: PH, CROWN 4

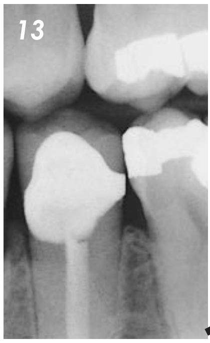


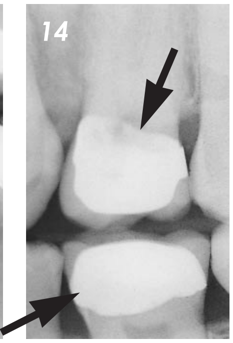


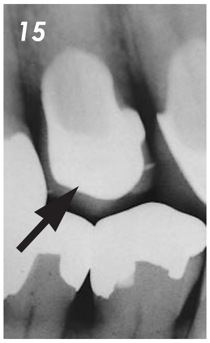


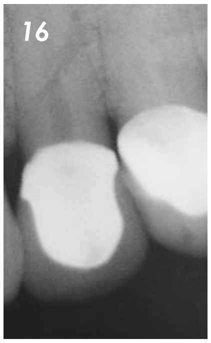
__(9)__ PATIENT: PH, CROWNS 14&15 __(10)__ PATIENT: KA, CROWN 12 __(11)__ PATIENT: KA, CROWNS 3,5



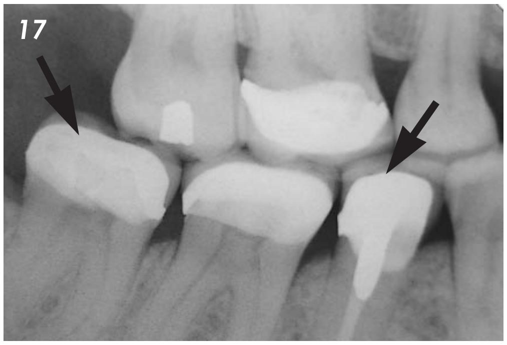


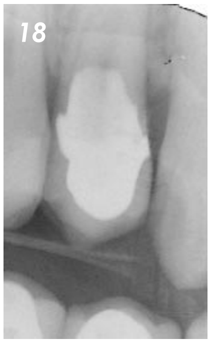


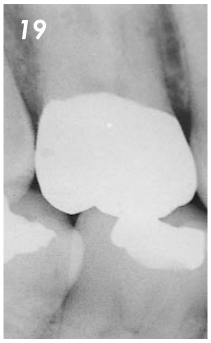


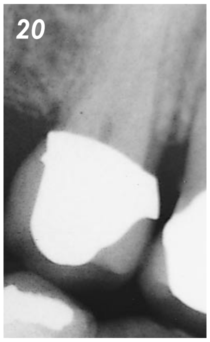


__(12)__ PATIENT: DH, CROWNS 14&15 __(13)__ PATIENT: KM, CROWN 20 __(14)__ PATIENT: SO, CROWNS 14&19 __(15)__ PATIENT: RB, CROWN 5 __(16)__ PATIENT: RS, CROWN 11

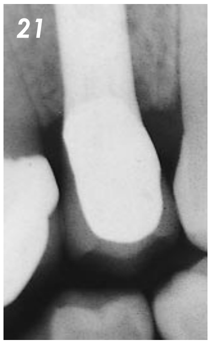


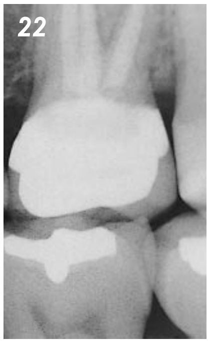


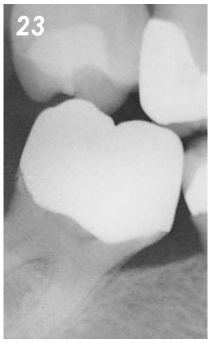


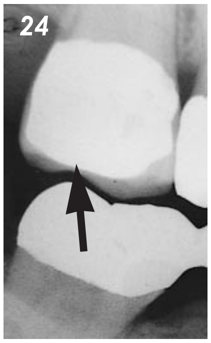


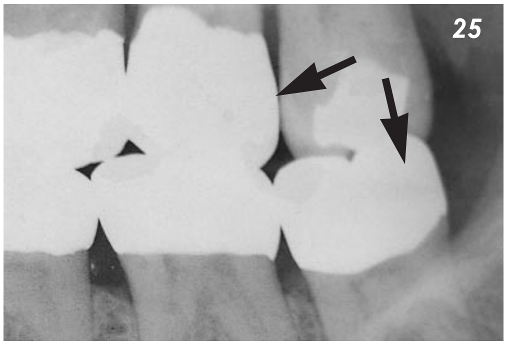
__(17)__ PATIENT: MK, CROWNS 29&31 __(18)__ PATIENT: SE, CROWN 5 __(19)__ PATIENT: MM, CROWN 2 __(20)__ PATIENT: PH, CROWN 4



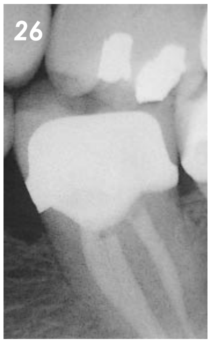


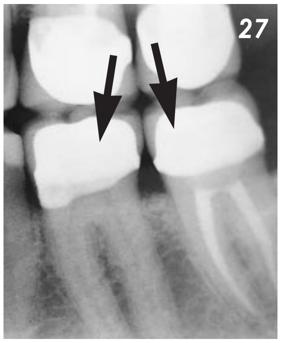


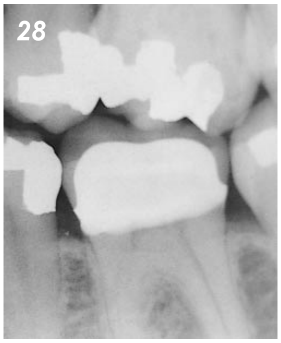


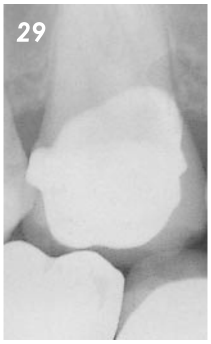


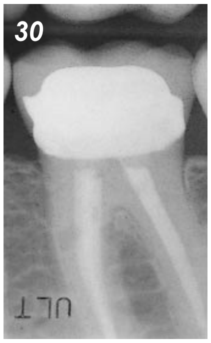
__(21)__ PATIENT: MM, CROWN 12 __(22)__ PATIENT: TH, CROWN 14 __(23)__ PATIENT: RS, CROWN 31 __(24)__ PATIENT: LK, CROWN 2 __(25)__ PATIENT: PP, CROWN 15&17



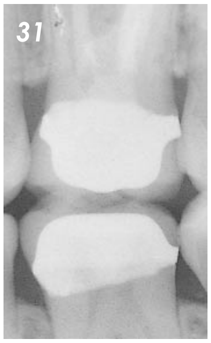


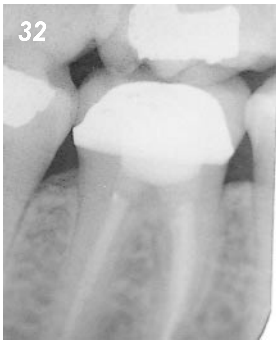


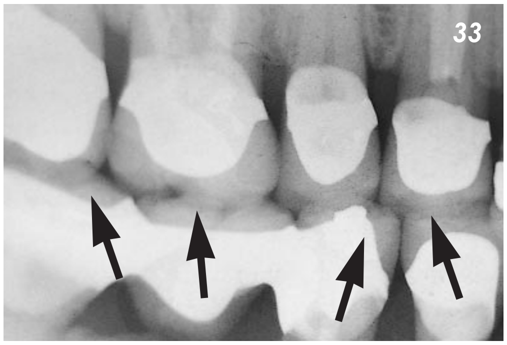


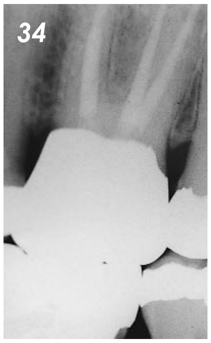


__(26)__ PATIENT: BM, CROWN 19 __(27)__ PATIENT: AG, CROWNS 18&19 __(28)__ PATIENT: SW, CROWN 19 __(29)__ PATIENT: AV, CROWN 14 __(30)__ PATIENT: JT, CROWN 19









__(31)__ PATIENT: EK, CROWN 14 __(32)__ PATIENT: EK, CROWN 30 __(33)__ PATIENT: RS, CROWNS 2,3,4,5 __(34)__ PATIENT: KB, CROWN 14